Maine-ly Weather

Summer 2011

In This Edition

Our New Warning Coordination Meteorologist,
by Mark Bloomer

There is a new Warning Coordination Meteorologist at the National Weather Service office in Caribou. Noelle Runyan moved to Caribou the beginning of April. Noelle began her National Weather Service career nearly 18 years ago in Des Moines, IA in 1993, just as the Great Flood of the Midwest began. She transferred to the NWS office in Wichita, KS in 1995 as a Meteorologist Intern and was promoted on station to Meteorologist a few years later. Noelle was then promoted to a Senior Meteorologist position at the NWS office in Kansas City/Pleasant Hill, MO in September 2001. In fact, her career in the Kansas City area also had a memorable beginning, as her first day was September 11, 2001.

Growing up on a farm in north central Iowa, Noelle has always been fascinated by weather. Her interest in meteorology as a career began when she was 10 yrs old, when a local television meteorologist gave a presentation to her grade school classroom. Noelle attended Parks College of Saint Louis University for a year of course work then took a couple of years off. She then attended Iowa State University and earned a Bachelor of Science Degree in Meteorology.

Noelle’s focus in the National Weather Service has been outreach oriented, working with emergency responders, emergency management personnel, the media, and the public. She has mentored area teachers as a member of the AMS DataStreme project since 1999. She wrote the Kansas City Regional Science Olympiad tests in ’06, ’07, ’08, and ‘11, as well as mentoring area students who would go on to the National competition. She also participated in Science Bowl, NAACP Olympics of the Mind and ‘Women in Science’.

A County Boy Returns

by: Mike Fortin

After a hiatus of almost 29 years I have returned home to the "County".
Originally from Madawaska, I left the County to seek adventure and see where life would lead me. I joined the U. S. Air Force and spent 5 years there, one year at Lowry AFB just outside Denver Colorado, three years in Alaska stationed at Elmendorf AFB, and a short year at Holloman AFB, New Mexico. I decided that the Air Force was not a career for me, so I joined other people in the ranks of civil service. I spent 5 years as a D.O.D. civil servant stationed at Otis ANGB on Cape Cod, Massachusetts, then transferred back to an old stomping ground in Alaska, Elmendorf AFB. I spent another 6 years stationed at Elmendorf before departing for greener pastures in the civilian world. I moved to Rome, New York to work for General Electric, and after a brief period, came to the realization that I had made a mistake. I applied to the National Weather Service as an Electronic Technician back in April 2000 and was accepted in Taunton, Massachusetts. I spent almost 11 years at that office when an opening came up in Caribou, which I applied for and the rest is history.
In all my travels and being stationed at different locations, I have come to the realization that nothing compares to the quality of life in the "County". I like to say "I am finally home"

Welcome our new intern Paul Fitzsimmons

by: Mark Bloomer

Born and raised in Massachusetts, Paul grew up as an avid snowstorm enthusiast -experiencing first hand the 1993 Superstorm and the April Fool's Day storm of 1997. After graduating from Plymouth State University in 2003, Paul spent 7 and a half years working in Toronto at Canada's Weather Network – a cable channel providing 24 hours a day weather coverage much like The Weather Channel. While there, he worked as a studio meteorologist delivering weather briefings to the on camera presenters and creating weather graphics before moving to the forecast center. His duties also included relaying severe weather watches and warnings to the television show teams. As a forecaster he was responsible for using the graphical forecast editor to make forecasts for the eastern half of Canada out to 14 days and providing decision support for the opening and closing of the retractable roof at the Rogers Center.

Paul is excited to be back in New England. He was drawn to the Caribou area by his love of winter weather and the outdoors. He loves nature and is an avid skier, hiker, and runner.

Welcome our new journeyman Maureen Hastings

by: Mark Bloomer

Maureen was born and raised in northeast Kansas, where the region's ever-changing weather caught her interest early in her childhood. When the Central and Southern Plains were hit by a large tornado outbreak in April 1991, including an F5 that struck Andover, a town just north of Wichita, she was hooked. She attended the University of Oklahoma, earning her bachelor's degree in meteorology with minors in hydrology and math, and spent her spare time storm chasing and volunteering at the Norman office of the National Weather Service. After graduation, she accepted a job with the NWS in Burlington, VT, where she quickly became indoctrinated to the challenges of weather forecasting in northern New England. She worked in Burlington for 7 years, and deciding she needed another change of pace, and accepted a position as general forecaster in Caribou late last year. Here she hopes to put her hydrology experience to good practice as the office's new Hydrology Focal Point. Although she is very far from home, the agricultural, slower-paced lifestyle of the County, so reminiscent of rural Kansas, immediately put her at ease. She looks forward to becoming a part of the community which has been so welcoming since her arrival early this year.

The Character of the Winter of 2010-2011
by: Victor J. Nouhan

1. Major Atmospheric and Oceanic Forcing Factors Affecting the Winter of 2010-2011.
The winter of 2010-2011 featured strong blocking in the upper atmosphere over the far north Atlantic ocean basin and northeast Canada associated with seasonal North Atlantic Oscillation (NAO) and the warm phase of the Atlantic Multi-decadal Oscillation (AMO). In particular, this blocking varied from intense in the beginning of the winter season to weak-moderate late in the winter. In addition, moderately strong La-Nina conditions occurred during most of the winter over the equatorial Pacific, a sharp transition from moderately strong El-Nino conditions that prevailed last winter. These two factors were the most important in giving the winter of 2010-2011 a split character over much of Northern and Downeast Maine, in particular northeast Aroostook County. Those who wish can read through section 2 for background information on Atmospheric/Oceanic forcing factors that affect winter weather over northern and eastern Maine. Otherwise, please proceed to section 3 regarding the character and impact on the northern/eastern Maine winter this past season.

2. Background Information on Atmospheric/Oceanic Forcing Factors Affecting Northern/Eastern Maine Winters

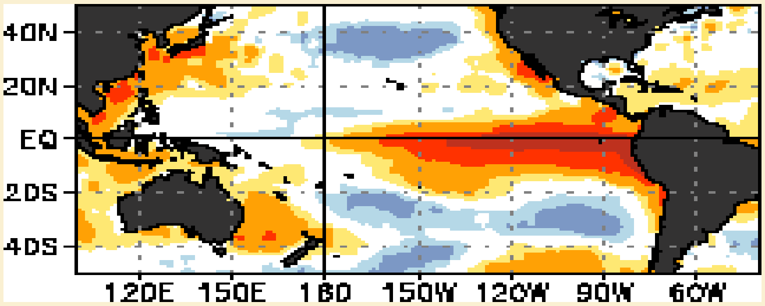
The following information relates to El-Nino and La-Nina:

Table 1 (El-Nino vs. La-Nina Years)

Warm-El-Nino (red) and Cold La-Nina (blue) events since 1997 based on ocean water temperature anomalies in degrees Celsius for the eastern and central equatorial Pacific.

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1997	-0.4	-0.3	0.0	0.4	**0.8**	**1.3**	**1.7**	**2.0**	**2.2**	**2.4**	**2.5**	**2.5**
1998	**2.3**	**1.9**	**1.5**	**1.0**	**0.5**	0.0	**-0.5**	**-0.8**	**-1.0**	**-1.1**	**-1.3**	**-1.4**
1999	**-1.4**	**-1.2**	**-0.9**	**-0.8**	**-0.8**	**-0.8**	**-0.9**	**-0.9**	**-1.0**	**-1.1**	**-1.3**	**-1.6**
2000	**-1.6**	**-1.4**	**-1.0**	**-0.8**	**-0.6**	**-0.5**	-0.4	-0.4	-0.4	**-0.5**	**-0.6**	**-0.7**
2001	**-0.6**	**-0.5**	-0.4	-0.2	-0.1	0.1	0.2	0.2	0.1	0.0	-0.1	-0.1
2002	-0.1	0.1	0.2	0.4	**0.7**	**0.8**	**0.9**	**1.0**	**1.1**	**1.3**	**1.5**	**1.4**
2003	**1.2**	**0.9**	**0.5**	0.1	-0.1	0.1	0.4	0.5	0.6	0.5	0.6	0.4
2004	0.4	0.3	0.2	0.2	0.3	**0.5**	**0.7**	**0.8**	**0.9**	**0.8**	**0.8**	**0.8**
2005	**0.7**	**0.5**	0.4	0.4	0.4	0.4	0.4	0.3	0.2	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.1	0.1	0.2	0.3	**0.5**	**0.6**	**0.9**	**1.1**	**1.1**
2007	**0.8**	0.4	0.1	-0.1	-0.1	-0.1	-0.1	-0.4	**-0.7**	**-1.0**	**-1.1**	**-1.3**
2008	**-1.4**	**-1.4**	**-1.1**	**-0.8**	**-0.6**	-0.4	-0.1	0.0	0.0	0.0	-0.3	-0.6
2009	-0.8	-0.7	-0.5	-0.1	0.2	**0.6**	**0.7**	**0.8**	**0.9**	**1.2**	**1.5**	**1.8**
2010	**1.7**	**1.5**	**1.2**	**0.8**	0.3	-0.2	**-0.6**	**-1.0**	**-1.3**	**-1.4**	**-1.4**	**-1.4**
2011	**-1.3**	**-1.2**										

Fig 1 (EL-Nino vs. La-Nina Sea Surface Temperature Anomalies cross the Tropical Pacific)



El Niño

La Niña

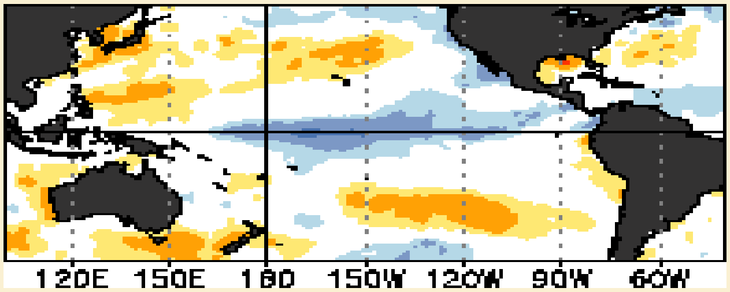
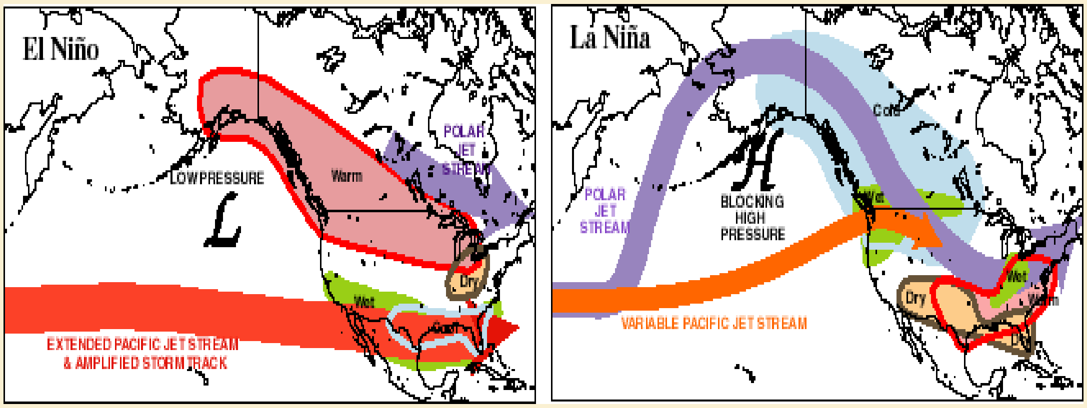


Fig 2 (Winter Impacts From Moderate to Strong El-Nino's/La-Nina's)



After ENSO, water temperature anomalies (differences from normal) across the mid and high latitudes of the Pacific and all of the north Atlantic are next in importance. These anomalies are tied to longer multi-decadal cycles referred to the Atlantic Multi-decadal Oscillation (AMO) and the Pacific Decadal Oscillation (PDO) which run through a complete cycle (warm to cold to warm again) in a 50 to 70 year span. Of the two, the AMO is more defined by its year to year persistence and generally has greater impact on winters over the eastern U.S. The PDO tends to be more irregular on a year to year basis, with its trend more determined on the average of the cycle over several successive years compared to AMO. The AMO and PDO do not operate in concert with each other, with the warm (cold) phase of the PDO leading the AMO by 15 to 25 years. This is important, since even in the absence of (near neutral) ENSO forcing, there potentially is a lot of variability to winter character/ severity to North America brought about by these two oceanic oscillations alone as a result of their phase relationship.

During the warm, positive (cold, negative) phase of AMO, warmer (colder) water temperature anomalies dominate much of the north Atlantic and blocking highs in the upper atmosphere over the far north Atlantic, Greenland, and northeast Canada can occur much more (much less) frequently. If acting alone, this greater (lesser) blocking results in a more (less) frequency of arctic jet streams originating from northwest Canada to be directed into central/eastern continental U.S., with less (more) incursions of Atlantic maritime air to especially eastern Maine. Figure 4 below shows the trend of the AMO over the last century and a half. Note that the index is near a maximum similar to the late 1940s to early 1960s.

Fig 3 (Examples of recent strongly warm and weakly warm monthly AMO anomalies)

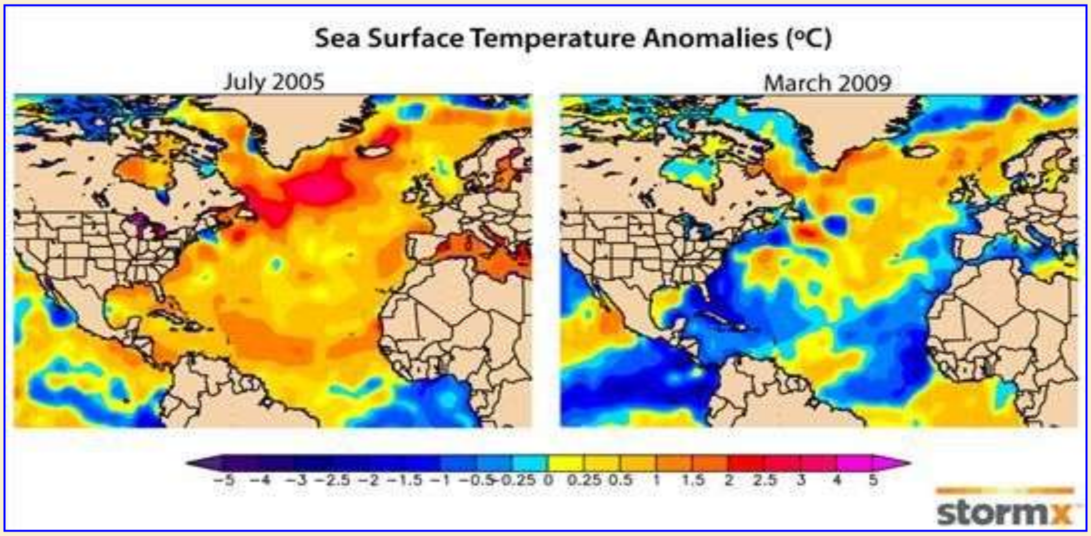


Fig 4 (Cycle of AMO through the past 150 years)

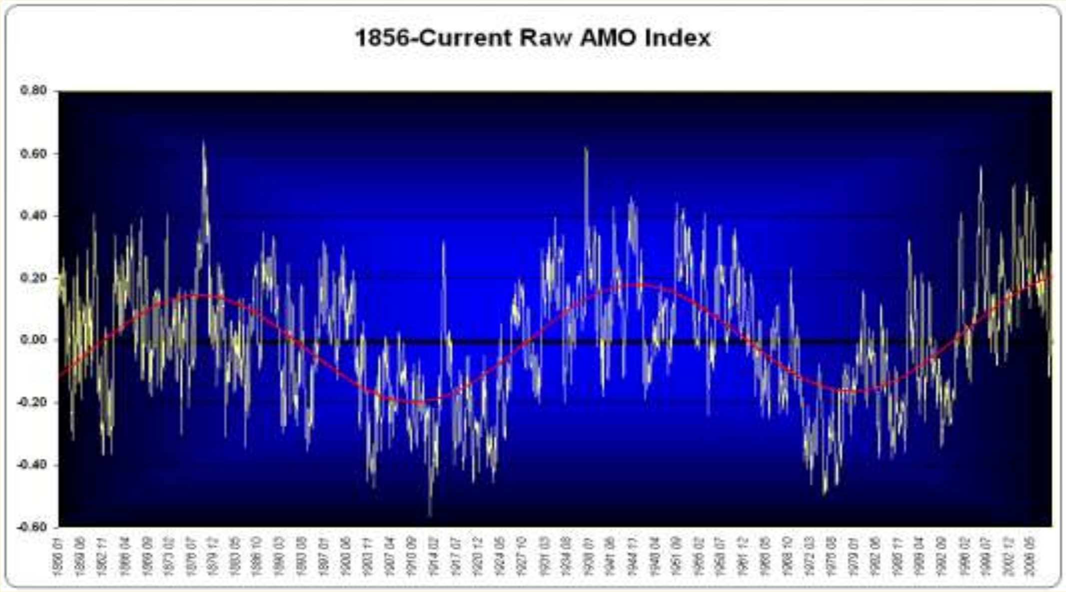


Table 2 (Monthly AMO values since 1997; Blue weakly cool, Orange weakly warm, Red strongly warm)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1997	-0.06	-0.01	0.04	0.04	0.06	0.04	0.10	0.05	0.14	0.18	0.08	0.16
1998	0.16	0.32	0.35	0.33	0.41	0.52	0.52	0.55	0.45	0.42	0.36	0.31
1999	0.08	0.09	0.10	0.09	0.20	0.22	0.24	0.35	0.23	0.06	-0.01	0.05
2000	-0.05	-0.09	0.13	0.08	0.14	0.02	0.11	0.14	0.14	-0.00	-0.01	-0.09
2001	-0.09	0.01	0.06	0.03	0.02	0.23	0.18	0.22	0.33	0.30	0.20	0.25
2002	0.21	0.20	0.18	0.07	-0.01	-0.08	-0.02	0.15	0.12	0.15	0.06	0.04
2003	0.09	0.02	0.14	0.11	0.19	0.25	0.32	0.46	0.49	0.47	0.26	0.26
2004	0.24	0.24	0.19	0.15	0.03	0.21	0.27	0.36	0.28	0.28	0.27	0.23
2005	0.15	0.16	0.32	0.33	0.33	0.36	0.49	0.48	0.46	0.28	0.17	0.25
2006	0.16	0.10	0.09	0.23	0.34	0.37	0.42	0.45	0.41	0.38	0.32	0.20
2007	0.20	0.25	0.16	0.20	0.15	0.13	0.17	0.10	0.14	0.20	0.22	0.15
2008	0.06	0.16	0.20	0.08	0.21	0.30	0.25	0.21	0.24	0.14	0.04	0.06
2009	-0.02	-0.13	-0.13	-0.09	-0.03	0.16	0.27	0.19	0.10	0.21	0.11	0.12
2010	0.08	0.21	0.33	0.47	0.50	0.49	0.50	0.57	0.49	0.37	0.28	0.25
2011	0.18	0.15										

During the warm (cold) phase of the PDO, warmer (colder) water temperature anomalies tend to dominate across the equatorial and eastern north Pacific while colder (warmer) anomalies tend to dominate across the mid-high latitudes of the central and western north Pacific. Acting alone, the warm (cold) phase of the PDO tends to direct the arctic jet stream from northwest Canada toward the eastern (western) CONUS during winter. The figures and table below illustrate these phases of PDO and the trend.

Fig 5 (Warm vs. Cool Phases of the PDO)

warm phase *cool phase*

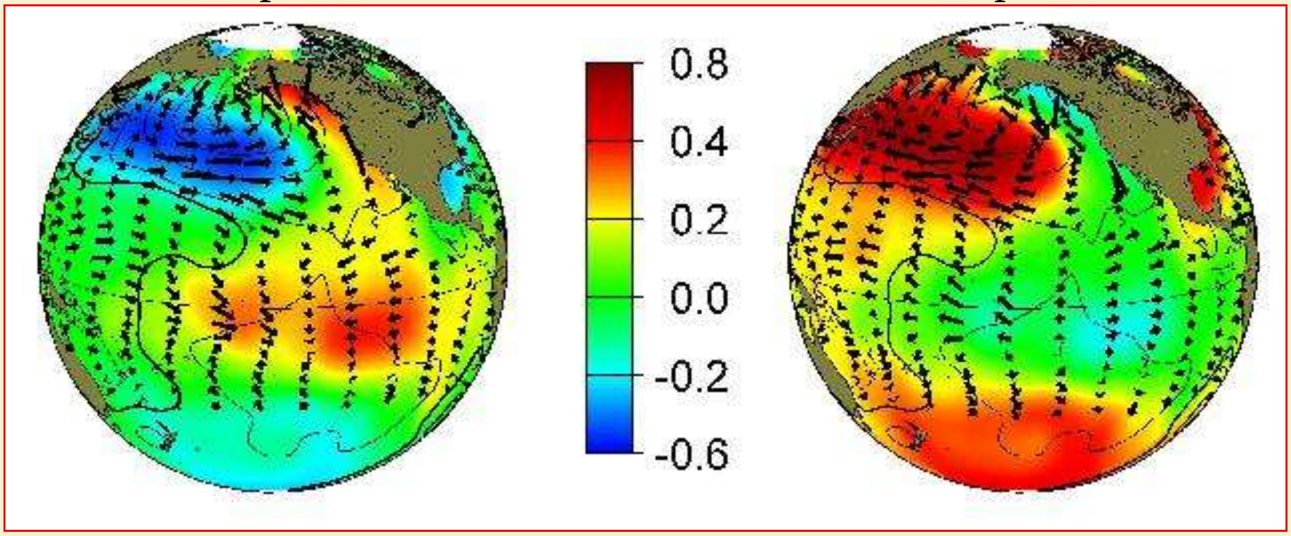


Fig 6 (The PDO Cycle over the last 100+ years)

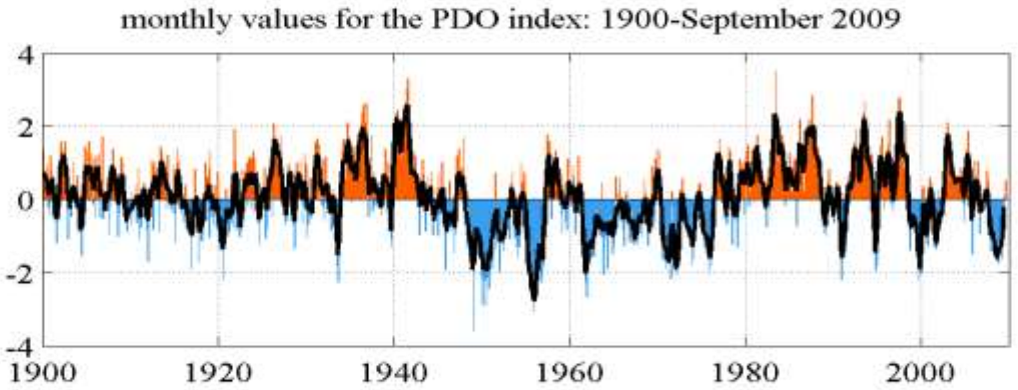


Table 3 (Monthly PDO Values Since 1997; Blue cool, Black near neutral, and Red warm)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1997	0.23	0.28	0.65	1.05	1.83	2.76	2.35	2.79	2.19	1.61	1.12	0.67
1998	0.83	1.56	2.01	1.27	0.70	0.40	-0.04	-0.22	-1.21	-1.39	-0.52	-0.44
1999	-0.32	-0.66	-0.33	-0.41	-0.68	-1.30	-0.66	-0.96	-1.53	-2.23	-2.05	-1.63
2000	-2.00	-0.83	0.29	0.35	-0.05	-0.44	-0.66	-1.19	-1.24	-1.30	-0.53	0.52
2001	0.60	0.29	0.45	-0.31	-0.30	-0.47	-1.31	-0.77	-1.37	-1.37	-1.26	-0.93
2002	0.27	-0.64	-0.43	-0.32	-0.63	-0.35	-0.31	0.60	0.43	0.42	1.51	2.10
2003	2.09	1.75	1.51	1.18	0.89	0.68	0.96	0.88	0.01	0.83	0.52	0.33
2004	0.43	0.48	0.61	0.57	0.88	0.04	0.44	0.85	0.75	-0.11	-0.63	-0.17
2005	0.44	0.81	1.36	1.03	1.86	1.17	0.66	0.25	-0.46	-1.32	-1.50	0.20
2006	1.03	0.66	0.05	0.40	0.48	1.04	0.35	-0.65	-0.94	-0.05	-0.22	0.14
2007	0.01	0.04	-0.36	0.16	-0.10	0.09	0.78	0.50	-0.36	-1.45	-1.08	-0.58
2008	-1.00	-0.77	-0.71	-1.52	-1.37	-1.34	-1.67	-1.70	-1.55	-1.76	-1.25	-0.87
2009	-1.40	-1.55	-1.59	-1.65	-0.88	-0.31	-0.53	0.09	0.52	0.27	-0.40	0.08
2010	0.83	0.82	0.44	0.78	0.62	-0.22	-1.05	-1.27	-1.61	-1.06	-0.82	-1.21
2011	-0.92	-0.83										

3. The Character and Impact of the 2010-2011 Winter on Northern/Eastern Maine

Winter across northern/eastern Maine began mild and stormy with much above normal temperatures and precipitation. December in particular, closely mirrored the very mild months of January and February of 2010, which featured very strong blocking upper highs over the far north Atlantic and northeast Canada, resulting in frequent incursions of maritime Atlantic air into particularly eastern portions of the region as low pressure systems backed into the region from the open Atlantic south of Nova Scotia. Unlike the winter of 2009-2010 however, under La-Nina conditions, much colder arctic air was being produced over central Canada and the northern Plains of the U.S., resulting in our area being bisected between the mild maritime air and colder continental air with a couple of storm systems. When this occurred, heavy snow fell over northwest and Downeast Maine, while northeast Maine experienced much reduced snow totals from snow changing to rain or heavier snow being forced south of the region, resulting in a slow start to the seasonal snow pack across the northeast.

After the opening of January, blocking over the far north Atlantic and northeast Canada lessened, allowing colder air to gradually prevail across all of the region. Despite this, the prevailing storm tract this month favored east central and Downeast portions of the region to receive the heaviest snow totals from individual storms, with lesser amounts north, to the point where to 2 to 3 times the snow pack existed over Downeast areas compared to the far north. This resulted in officials having to truck snow to help prepare the venues for the international Biathlon events to be held at Presque Isle and Fort Kent on the opening days of February.
By February, with less affects from blocking, the atmospheric circulation became more under the influence of La-Nina, resulting in a gradual northern shift of storm track. This resulted in more frequent heavy snowfall with individual storms over far northern areas, increasing snow changing to rain events over Downeast areas, and lowering the snow pack disparity across all of the region. By early March, snow pack distribution returned close to climatology when a complex storm system brought rain changing to heavy snow across northern areas and mostly heavy rain across east central and Downeast areas along with a narrow belt of ice between these two areas. The last widespread heavy snow event for the region as a whole came in the opening days of April

Overall, the winter for the region averaged above normal for temperatures due to a very mild December and mild January, and above normal for seasonal snowfall. Seasonal snowfall, however, varied widely from below normal across the far north (particularly the Saint John Valley) to above/much above normal for east central and Downeast areas.

Table 4 (the following table summarizes past winters relative to the conditions that helped shape their character for northern and eastern Maine as a whole)

Winter Season	Character	ENSO	AMO	PDO	Onset
2007-08	Record Snow North, Near Normal Snow Downeast Near Normal Temperatures	Moderate La-Nina	Moderate Warm- Accompanied by moderate high latitude North Atlantic Blocking	Moderate to Strong Cold	Early
2008-09	Above Average Snow Intermittent, Well Below Normal Temperatures	Near Neutral, Weak La-Nina	Moderate Warm- Accompanied by moderate high latitude North Atlantic Blocking	Weak to Moderate-Cold	Early
2009-10	Below Normal Snow North and East, Near Normal Snowfall South and West Persistent Much Above Normal Temperatures	Moderate to Strong El-Nino	Strong Warm- Accompanied by strong high latitude North Atlantic Blocking	Near Neutral	Late
2010-11	Below Normal Snow far North, Above to Much Above Normal Snowfall Central and Downeast Above Normal Temperatures	Moderate to Strong La-Nina	Moderate to Strong Warm	Moderate Cold	Late North, On time central and Downeast

Project Explore
by Ken Wallingford

Each year, for one week in late June, The University of Maine at Presque Isle (UMPI) hosts a program called “Project Explore”. Project Explore is a program for gifted and talented children in grades 2-8, from throughout northern Maine, through which the children learn about and experience a variety of subjects and topics ranging from origami to rock climbing to weather!

Since the spin-up of the NWS office here in Caribou in 1999, we have been an active participant each year in Project Explore. We typically work with children in grades 4-8 and strive to make the subject of weather fun and exciting for the kids. We also engage the children and allow them to become involved with their learning, which helps increase their interest and foster their ability to learn.

Project Explore runs two sessions for the children, each lasting about three hours. One session runs in the morning and one in the afternoon and we participate in either the morning or afternoon session, depending on the availability of our people. Instead of using just one instructor to teach our portion of Project Explore, we break up each day into (3) one hour sessions with each session hosted by an individual with special skills or knowledge in a particular area.

We start the week with an introduction to basic weather concepts such as; how clouds form, ingredients necessary for weather to occur, the seasons etc. We also cover the basic weather instruments used to measure weather before branching into some of the more specialized topics, which are taught by various office program leaders including:

-Hydrology (flash floods, Ice Jam flooding etc)
-Marine Weather
-Aviation Weather
-Winter Weather
-Hurricanes
-Severe Summer Weather (Tornados, Thunderstorms, Hail etc)

We conclude our week with a trip to the NWS office in Caribou on Thursday and a trip to visit TV Weatherman Ted Shapiro at WAGM TV in Presque Isle on Friday.

More information on Project Explore, including a listing of some of the other courses offered, can be found by visiting the University of Maine at Presque Isle web site at:
http://www.umpi.edu/files/faculty-staff/conferences/project-explore/brochure.pdf

Harbor Waves

by Tony Mignone

Late in the afternoon of November 6, 2010 Wesley Shaw, the harbor master for the town of Winter Harbor, Maine was sitting in the cabin of his 22 foot Cape Dory in the harbor when he noticed that the boat was no longer moving but felt to be bottomed out. A quick inspection after leaving the cabin verified that the boat was indeed high and dry. Looking north toward the head of Henry Cove he saw 3 mooring blocks exposed and rocks beyond the end of the launch ramp that he had never seen exposed before. The water then rose 3 feet over a period of no more than 1 minute. This turned out to be only the first of six up and down cycles that occurred during the next 55 minutes. Every 10 minutes the tide would drop down 2 or 3 feet and return up again.

What Wes Shaw experienced last November is commonly known as a harbor wave or sometimes called a meteotsunami since they are believed to result from meteorological origin. It actually results from two separate and independent components. The first component is the oscillation of the water within a harbor. Water within a harbor commonly sloshes back and forth quite similar to the water in a bath tub. This sloshing motion results from the motion of tidal water entering and leaving the harbor and wind waves impinging on the harbor entrance. Normally this motion is very subtle and goes unnoticed. Sometimes, however, another equally subtle long period wave generated in the deep ocean may impinge on the harbor entrance and greatly amplifies the sloshing motion in the harbor. Again, if we invoke the bath tub analogy, this is equivalent to manually sloshing the bathwater back and forth until it spills over the top of the tub.

The long period waves that enter a harbor from the ocean and trigger these phenomena have different origins. They can be generated by air pressure differentials around a weather front or they can be generated by wave stress differential in large ocean storms. These waves also go unnoticed since they are usually only a few inches tall and have very long periods of at least 30 seconds and more often of many minutes. If these waves enter a harbor and have the same period as the normal sloshing motion in a harbor they can couple with the normal harbor oscillation and result in the phenomena described above.

In Fig. 1 below, fluctuations can be seen at the time of low tide on November 6, 2010. These variations from the predicted tide level are likely infra-gravity waves likely generated in an off-shore storm. The period of these waves is several minutes and they are the likely cause of the phenomena observed at Winter Harbor.

Harbor waves have been observed along the Maine coast in the past. On January 9, 1926, at about noon, Bass Harbor suddenly emptied followed about a minute later by a 10 foot rush of water. The cause of this event was not attributed to a tsunami since there was no seismic activity observed in the Atlantic prior to the event. Another more recent event was observed at Booth Bay Harbor on October 28, 2008 when the water rose 8 feet over a period of 15 minutes then receded. This process occurred three more times over a very short duration.

Please address comments regarding this article to:
anthony.mignone@noaa.gov

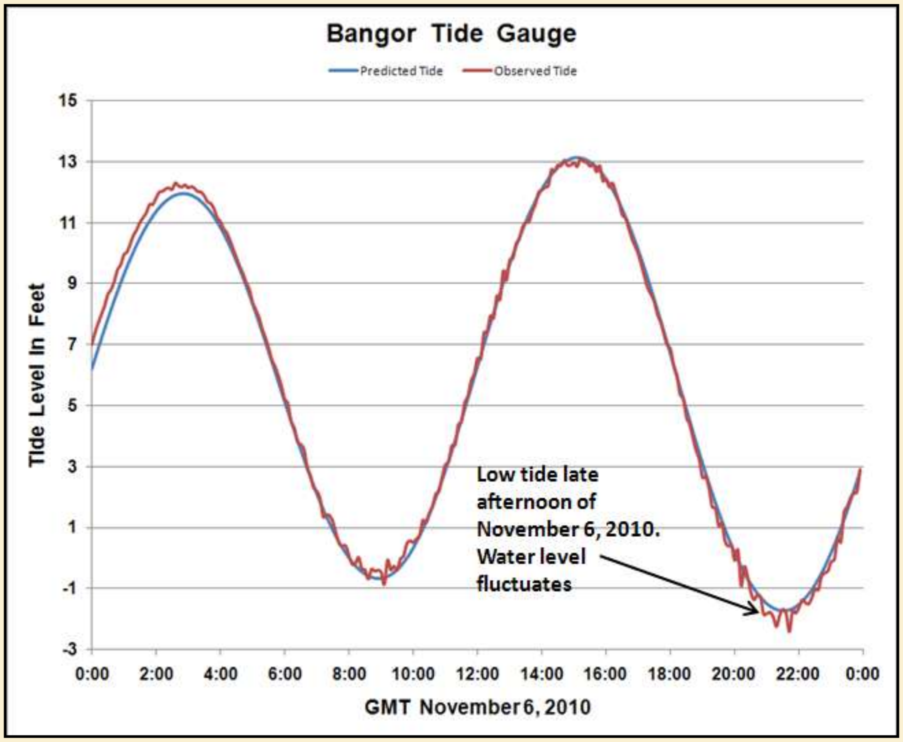


Figure 1 Bar Harbor tide gauge November 6, 2010.

Red Sky at Night
by Lorraine Maguire

Red sky at night, sailors delight. Red sky at morning, sailors take warning. This familiar weather lore has been around since people needed to predict weather. Sailors and farmers relied on it to navigate ships and plant crops. How many of us remember this verse as we were growing up. Even today, I find myself repeating the verse when I see a red sky. But is this old adage true?

Wikipedia and the Library of Congress explain that within limits, there is truth in this saying. Weather systems typically move from west to east and red clouds result when the sun shines on their undersides at either sunrise or sunset. The colors we see in the sky are due to sun rays being split into colors of the spectrum as they pass through the atmosphere and ricochet off the water vapor and particles in the atmosphere. The amounts of water vapor and dust particles in the atmosphere are good indicators of weather conditions. They also determine which colors we will see in the sky.

When we see a red sky at night, this means that the setting sun is sending its light through a high concentration of dust particles. This usually indicates high pressure and stable air coming in from the west. Basically good weather will follow.

If the morning skies are red, it is because clear skies to the east permit the sun to light the undersides of moisture-bearing clouds coming in from the west. This indicates that a storm may be moving to the east. If the morning sky is a deep red, it means that a high water content is in the atmosphere. Likely, rain is on its way.

Rite of Passage for an Intern

by Mike Hill

Last October, I began a transformation in the National Weather Service world. I started a big training process in the National Weather Service called the Distance Learning Operations Course also known as DLOC. This training is meant for interns in the weather service to learn about the radar and the ins and outs of warning decision. We get a huge binder full of information about how to read the radar returns and step by step instructions on how to work all of the features included on our workstations. For an intern, this is probably the biggest thing that you have to accomplish before you can be promoted to a General Forecaster. So I began all of this work in October, and put in many hours in front of a computer screen. We have to complete dozens of training modules and conference call learning sessions with the Warning Decision Training Branch in Norman, Oklahoma. We have a deadline to complete all of the modules before we go out to Norman for hands on training for a week with the instructors from the WDTB. Here we are put in an office setting with other interns from around the country, and we learn about how to communicate with each other while hazardous weather is going on. This is the best part of the training because it allows you to meet other interns and see how their offices handle certain situations. We practiced many severe weather scenarios as a team and individually. We had some of the best minds in meteorology teaching us what to look for in certain storms and how to effectively issue the correct warning for the situation. This training is very valuable. I completed my training in February in Norman, Oklahoma. It was one of the most interesting and fun times that I’ve had so far in my short meteorology career.

Three Amazing Early March Storms

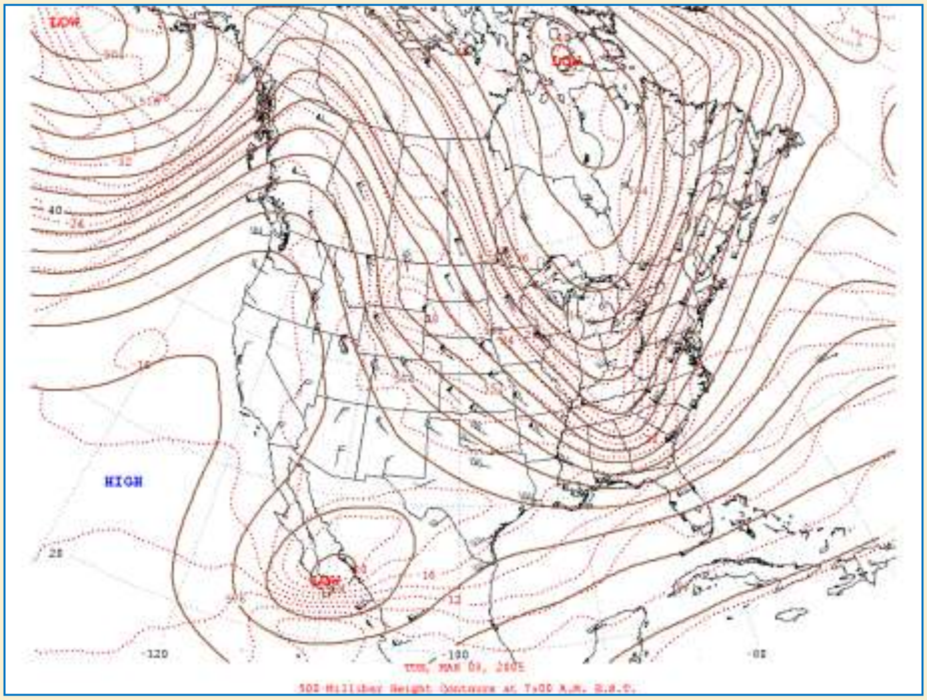
by Mark Bloomer

Three of the most interesting winter storms I have experienced in the twelve winters of forecasting for northern and eastern Maine all occurred at the end of the first week of March. All three were unusual storms. Normally a winter storm will move in as cold high pressure ahead of a system slides east and away. This allows the storm to come into a cold air mass that's already in place with precipitation beginning as snow and either remaining snow if the storm tracks south of the area or turning to mixed precipitation then rain if the storm tracks to the north. However, the three amazing storms that affected the area in early March all arrived at the same time a cold air mass was pressing into the region. For a storm to arrive at the same time cold air is arriving is unusual because typically a cold air mass will press in ahead of an approaching ridge while a storm will move in ahead of an approaching trough.

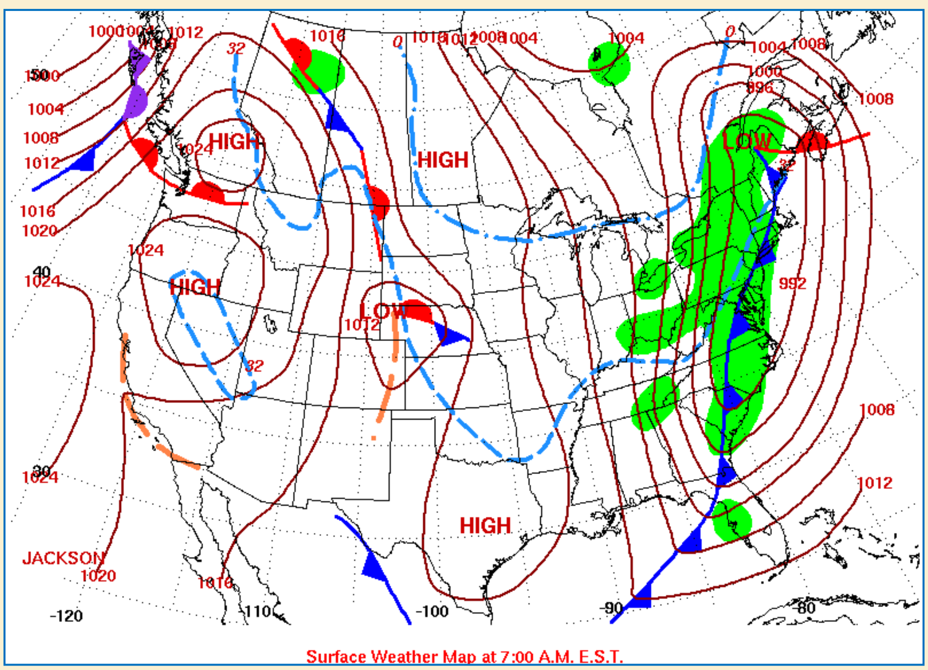
The key to all three storms seemed to be the strength of an upper low swinging through the southeast at the same time a small shortwave ridge built across the north. Deep cold air within the low giving the system deep circulation and strength allowed it to lift north into an oncoming cold air mass building down from the Canadian shortwave ridge.

Amazingly, all three storms, one in 2005, one in 2008 and one in 2011 all occurred with a day of March 7th.

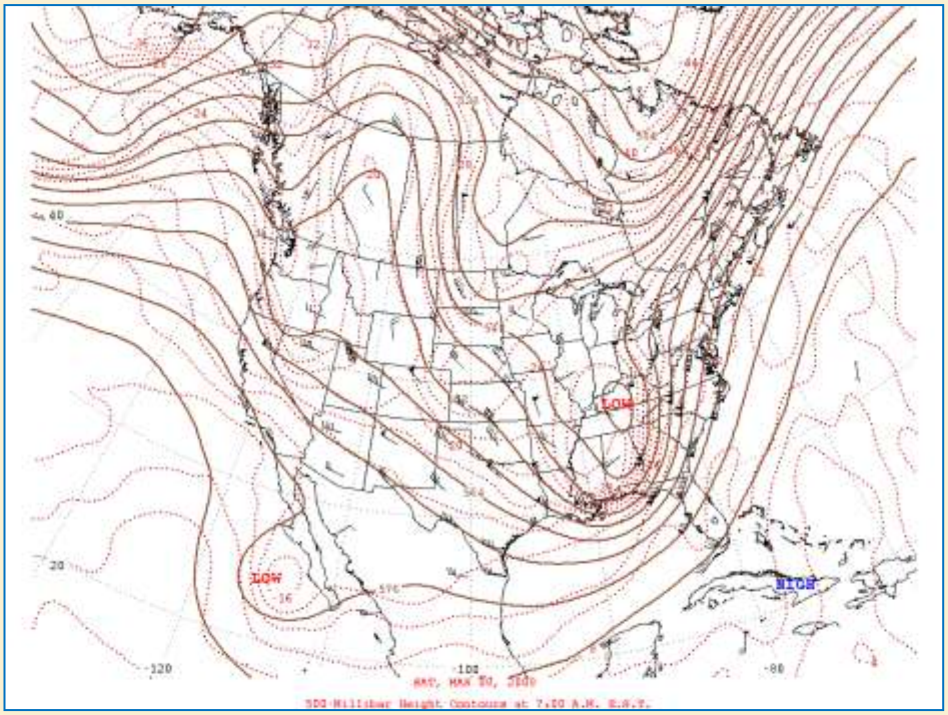
Below are maps from each of these events. All three systems featured rain which changed over to heavy sleet and snow as the new low developed in the southeast then lifted north when the cold air was arriving. On the upper air maps below (the top maps) note the troughs in the southeast getting ready to swing north. On the surface maps (the bottom maps) note, in the 2005 storm, that one low is lifting north through Maine pulling a cold front in as a second low is taking shape in North Carolina. On the surface maps for the 2008 and 2011 storm, note the cold high building into Quebec and pushing a cold front into Maine at the same time the new surface low was approaching from the south. In all three cases the cold air pressed in as the storm moved in resulting in heavy precipitation and falling temperatures.



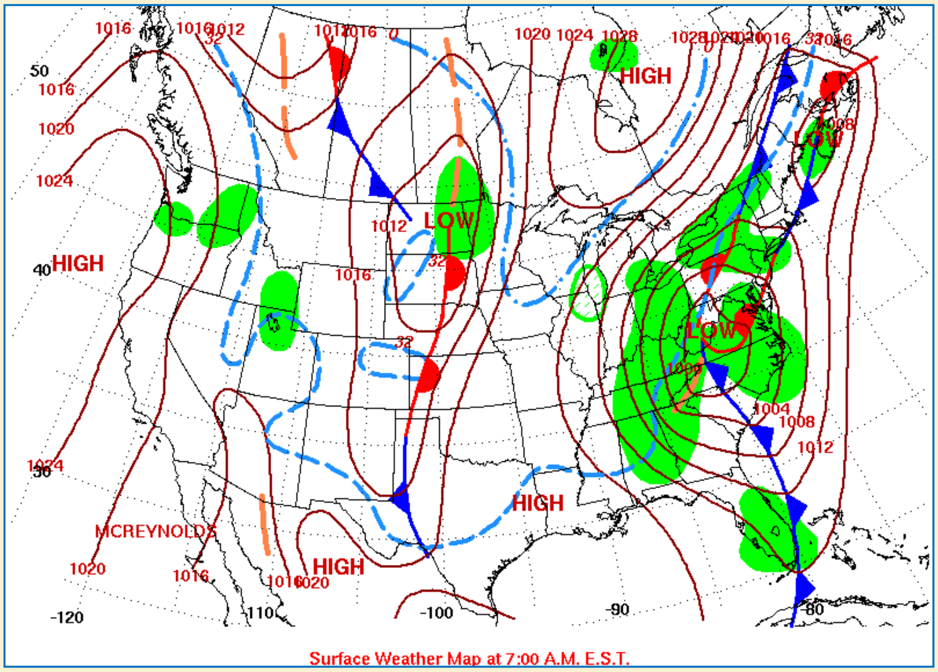
March 8 2005, upper level winds



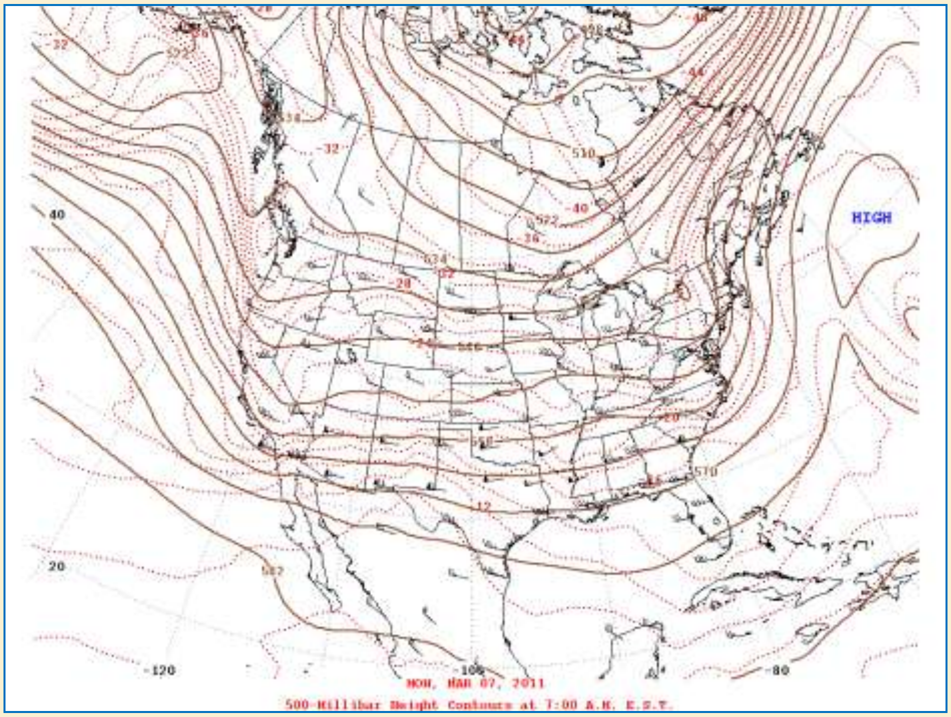
March 8 2005, surface weather map



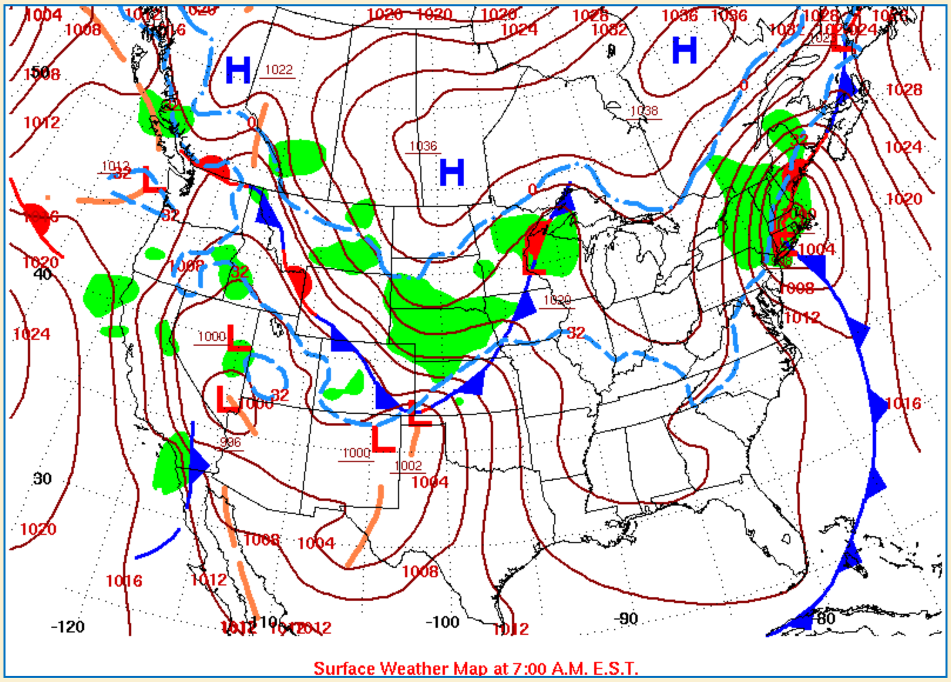
March 8 2008, upper level winds



March 8 2008, surface weather map



March 7 2011, upper level winds



March 7 2011, surface weather map